

# PATENT SPECIFICATION

927,361

DRAWINGS ATTACHED.

927,361



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## COMPLETE SPECIFICATION.

### Pallets and Pallet-Like Bodies for Road Vehicles.

I, JOHN DUNCAN BILLINGTON, a British Subject, of 15 Redhouse Lane, Westbury-on-Trym, Bristol 9, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to pallets and to pallet-like bodies for road vehicles.

Goods handled in bulk, for instance for transportation, are more and more frequently "palletised", i.e. packed into pallets or bulk carriers to form units which can be stored or handled as such. The units are commonly arranged for handling by fork-lift trucks but this is not necessarily the case. This is true of the motor car industry where pallets for containing four or more cars or car bodies are mounted on motor lorries for transportation.

The invention provides a pallet or pallet-like body comprising a framework the bottom of which forms a load-carrying base, a platform parallel to said base and movable in said framework to be raised and lowered relative to said base, and means for so moving the platform.

Preferably there are a plurality of screws extending upwardly from said base and the platform is supported by nuts engaging said screws, so that rotation of said screws raises or lowers the platform.

Said screws may all be rotated by a single endless chain or belt.

One specific embodiment of a pallet according to the invention is shown in the accompanying drawings in which:—

Figure 1 is a perspective view of a pallet; and

Figure 2 is a diagrammatic side view of the pallet of Figure 1, showing its attach-

ment to a chassis and relevant parts thereof;

Figure 3 is a plan view in the direction of arrows A—A of Figure 2, with the floor removed;

Figure 4 is an end view of the pallet and chassis of Figure 2; and

Figure 5 is a detail of the screw jack arrangement of the pallet.

The pallet of Figure 1 is intended for mounting either directly on the chassis of a lorry or a four-wheeled trailer with little alteration to the chassis.

The pallet comprises an open rectangular steel framework 24 ft. by 7½ ft. by 8½ ft. providing a base 11, corner pillars 12 and intermediate pillars 13. The pillars on each side are joined near their tops by a brace 14. The base is covered by a wooden floor 15.

Pillars 12 and 13 are of U-section, the open mouths of the U's facing generally inwardly of the pallet. Extending lengthwise of each corner pillar 12 is a screw 17, supported within the U-section. On each screw is a square nut 18 (Figure 5), which nut supports a corner of a platform 19 which extends parallel to the base of the pallet. The platform comprises a steel framework filled in by a wooden floor 20, the framework having members attached to or integral with cages 22 each of which surrounds a nut 18 to prevent rotation thereof. Each nut is formed of phosphor bronze and has its upper surface 23 formed at least partially convexly on a radius to mate with a concave surface 24 on a steel seating 25.

Each screw 17 is mounted in the pillar 12 by a thrust race 27 at the top of the pillar and by self-aligning ball races 28 and 29 at top and bottom. The screws are thereby in effect hung from the tops of the pillars.

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The bottom end of each pillar 12 has splined thereto a chain sprocket 31. A chain drive 32 (Figure 3) passes around each sprocket 31 and has at one end an adjustable tensioning sprocket 34, and at the other end two tensioners 35. Between the two tensioners 35 is the main driving sprocket 37, which itself is driven through a 10:1 reduction gear box 38 from a hydraulic motor 39.

Hydraulic power is supplied to the motor 39 through rubber pipes 40 which extend to self-sealing couplings 41 mounted on the base of the pallet.

The chain and driving system are mounted on the framework of the base of the pallet, the chain running in the U-section main side members of the framework. Pads (not shown) are mounted in said side members to support the chain, and the chain system is boxed in.

Hydraulic power for the chain drive system is supplied by a hydraulic gear pump driven from a power take off from the lorry gear-box. The gear pump (not shown) is mounted on the lorry chassis and supplies pressurized fluid to a manually-operated control valve 43 (Figure 2) at the rear of the chassis. Rubber tubing 44 connects the valve to the coupling 41 when the pallet is mounted on the chassis. An over load valve (not shown) is set to act at a predetermined pressure (in this case 1200 p.s.i.). Dummy connections (not shown) are provided on the chassis beneath the couplings 41 so that the tubing 44 can be connected thereto when the pallet is removed from the chassis.

Short shafts 46 are provided at intervals beneath the floors of both base and platform, and are capable of rotation by a removable handle.

A pawl and ratchet arrangement serves to lock each shaft against rotation in one direction, and a steel hawser carrying a hook at its free end is passed around each shaft. Trapdoors 47 are provided in the floors to allow the hooked end of the hawser through.

Both platform and base have at their rear ends pairs of extensions 50 spaced apart to form tracks for motor cars and the like. The extensions slide in runners attached to the frameworks between a retracted position as shown in Figure 3 and an extended position shown on the platform of Figure 1. The tops of the extensions are formed of hinged flaps. When extended, the flap 51 nearest the framework is rotated about its hinge to abut the framework and form a rising path to the level of the floor. For retraction the flap next to flap 51 is lifted, and flap 51 is rotated to be beneath the flap.

The pallet is attached to the chassis by locking means comprising bars 54 mounted under the pallet and transversely thereof.

Each bar is wedge-shaped at each end. The chassis immediately beneath the bar has a pair of worms of opposite hand and a shoe mounted on each worm carrying a roller. Rotation of the worms (by hand) carries the shoes towards one another so that the rollers engage the ends of the bar and ride up the wedges until they are tightly engaged thereon.

In addition the chassis may carry hook-like members (not shown) which are rotatable into engagement with frame members of the pallet.

In alternative arrangements the pallet shown in Figure 1 may be mounted in a four-wheeled trailer. In this case tubing 44 on the lorry chassis may be connected to couplings 41 of the trailer-borne pallet.

Alloy ramps are provided to allow cars being driven onto the pallet. The ramps may be formed on two parts and may be stowed beneath the lorry chassis when not in use. Short bridge ramps are also provided for connecting the rear extensions on a lorry-borne pallet to a pallet carried on a trailer attached to the lorry. Both ramps and bridges have hooks whereby they may be attached to the rear extensions.

The pallet has openings 53 through which the lifting forks of a fork-lift truck may be passed to lift the pallet onto or off from a chassis.

In use the platform is lowered till it rests upon the base. The rear extensions are placed in the extended position and the ramps are hooked onto them. Two cars are then driven up the ramps onto the platform one behind the other. The hooks on the hawsers are attached to body members of the cars and the hawsers tightened until the car springs are under compression. The extensions are retracted and the hydraulic power controls operated to drive the chain, rotate the screws and thereby raise the nuts and the platform. Since the screws are hung from the top the weight of the platform is taken by the screws in tension, not compression. The platform is also guided by tubes in the intermediate pillars 13.

When the platform is sufficiently raised the hydraulic power is stopped, and pins inserted in the pillars beneath the platform to prevent it running down the screws.

The extensions from the base are then extended and the ramps attached thereto, so that two further cars may be loaded onto the base.

Where two pallets are used one on the lorry and the other on the trailer, the cars may be driven up the ramps to the trailer and then across the bridge ramps to the lorry which is therefore loaded before the trailer.

If desired the platform may be lowered to rest upon the goods on the base to hold

them in position. Alternatively the platform may be used only as a roof for goods on the base.

5 A pallet according to the invention may be used on a four-wheeled trailer behind a lorry having a conventional pallet. Cars may be loaded onto the lowered platform of the trailer pallet, raised to the top level on the platform, and then driven across  
10 bridge ramps to the top level of the conventional pallet.

A pallet-like body according to the invention may be an integral part of a lorry, and may be readily adapted for transport of  
15 other goods than cars, e.g. car bodies, motor cycles, bicycles, refrigerators and other goods not normally carried in two layers, any normal palletised goods and trucks adapted for trans-shipment between road  
20 and rail vehicles.

#### WHAT I CLAIM IS:—

1. A pallet or pallet-like body comprising a framework, the bottom of which forms a load-carrying base, a platform parallel to  
25 said base and movable in said framework to be raised and lowered relative to said base, and means for so moving the platform.

2. A pallet or pallet-like body as claimed in Claim 1, wherein there are a plurality of screws extending upwardly from  
30 said base and the platform is supported by nuts engaging said screws, so that rotation of said screws raises or lowers the platform.

3. A pallet or pallet-like body as claimed in Claim 2 wherein said screws may  
35 all be rotated by an endless chain or belt.

4. A pallet or pallet-like body as claimed in Claim 3 wherein said endless chain or belt is itself driven by a hydraulic  
40 motor.

5. A pallet or pallet-like body as claimed in any of Claims 1 to 4 wherein said base and said platform have retractable rearward extensions.

45 6. A pallet or pallet-like body as claimed in any of Claims 1 to 5 wherein said base and said platform have hooked hawsers whereby goods may be maintained in place, and means for tightening said  
50 hawsers.

7. A pallet as claimed in any of Claims 1 to 6 wherein said base has openings for engagement by the forks of a fork-lift truck.

55 8. A pallet as claimed in any of Claims 1 to 7 having quickly releasable attachment means for attaching the pallet to a vehicle chassis.

9. A pallet-like body as claimed in any one of Claims 1 to 7 constructed as a fixed  
60 part of a lorry.

10. A pallet as described hereinbefore

with reference to the accompanying drawings.

11. A vehicle chassis having a pallet or pallet-like body as claimed in Claim 4  
65 mounted thereon, said chassis being adapted by having a hydraulic pump driven from the gear-box or other powdered part of the vehicle, a control valve for pressurized fluid supplied by said pump, and connections  
70 whereby said fluid may be supplied from said control valve to said hydraulic motor.

12. A vehicle chassis as claimed in Claim 11 wherein said pallet has mounted  
75 beneath its base a bar which is wedge shaped at each end, and the chassis has a pair of rollers and means for moving the rollers towards one another and into engagement one at each end of said bar, so that the  
80 rollers may ride up the wedge-shaped ends to engage tightly thereon, whereby the pallet is locked to the chassis.

13. A vehicle chassis having a pallet mounted thereon substantially as described  
85 hereinbefore with reference to Figures 2, 3 and 4 of the accompanying drawings.

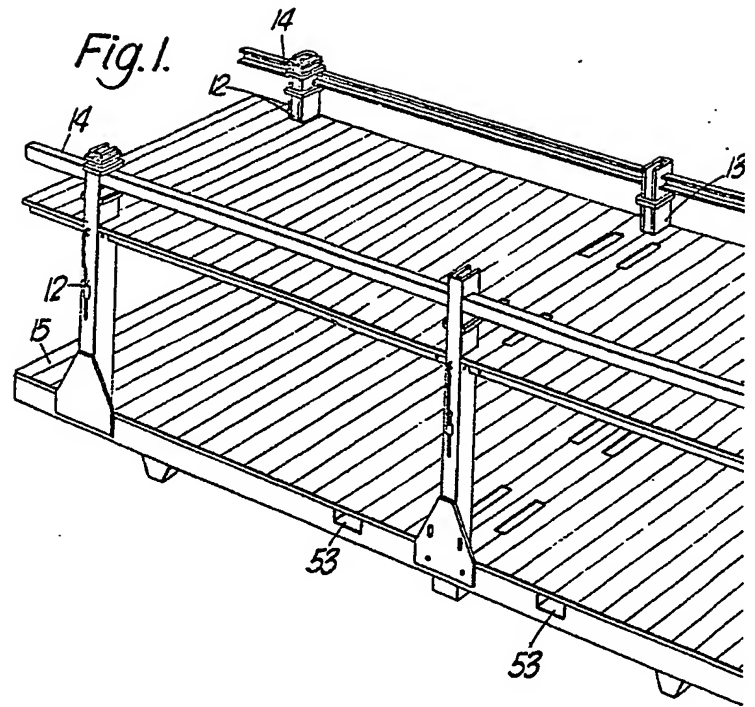
14. A vehicle chassis having a pallet-like body comprising a rectangular load-carrying base, four guide pillars upstanding from the base, two at each side thereof, a  
90 load-carrying platform supported over the base substantially parallel thereto by nuts engaging four upright screws, one at each pillar, and movable up and down by rotation of the screws, and a motor with a  
95 chain drive to the screws for effecting the rotation thereof.

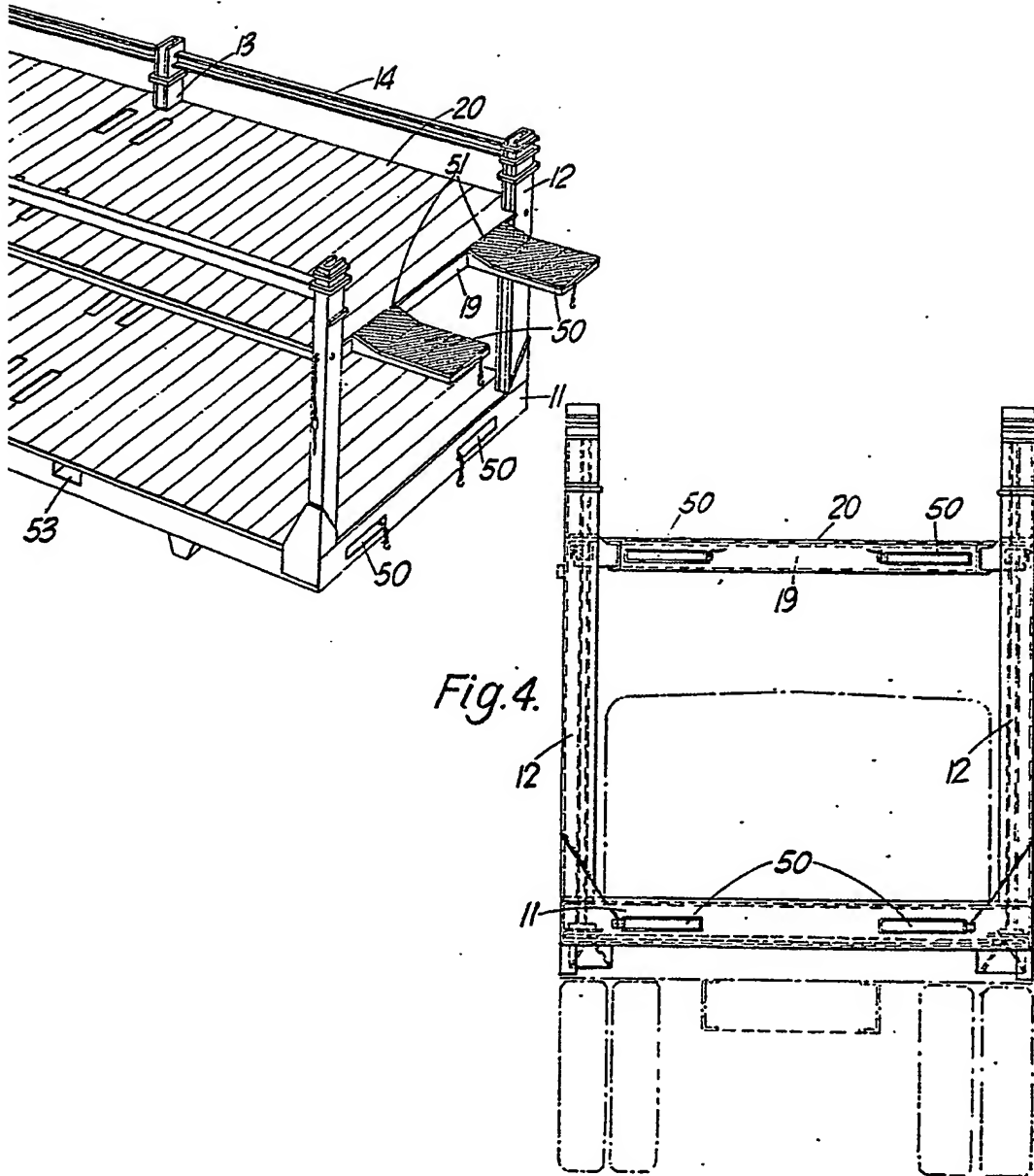
15. The combination of a self-propelled vehicle and a trailer, of which one has a pallet or pallet-like body as claimed in any  
100 one of Claims 1 to 10 and the other has a load-carrying base and, above the base, a load-carrying platform and bridge ramps between the bases of the vehicle and trailer or the platforms thereof or both.  
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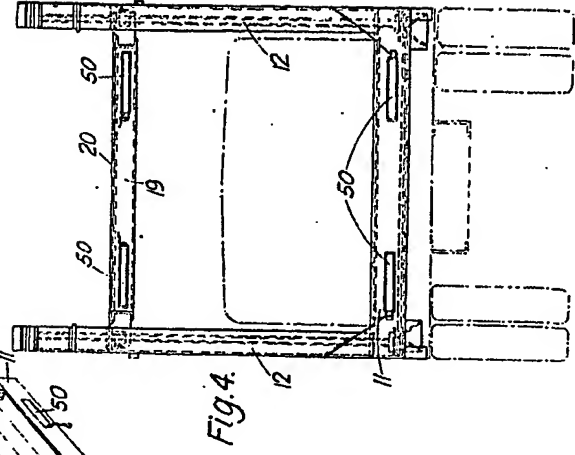
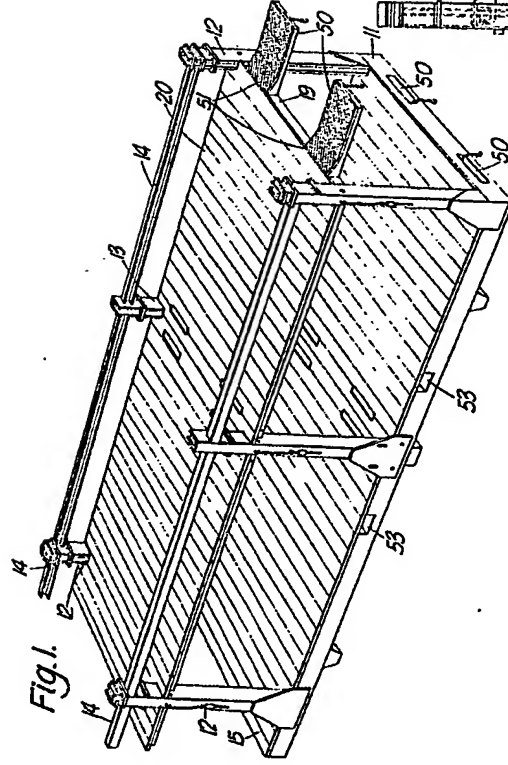
16. The combination as claimed in Claim 15 in which the vehicle and trailer both have pallets or pallet-like bodies as claimed in any one of Claims 1—10.

17. The method of loading the combination claimed in Claim 15 with motor cars  
110 which comprises driving a car up ramps at the rear of the trailer onto the pallet platform, while lowered, raising the platform to the level of the platform of the other member of the combination and then driving the  
115 vehicle over bridge ramps onto the platform of the other member.

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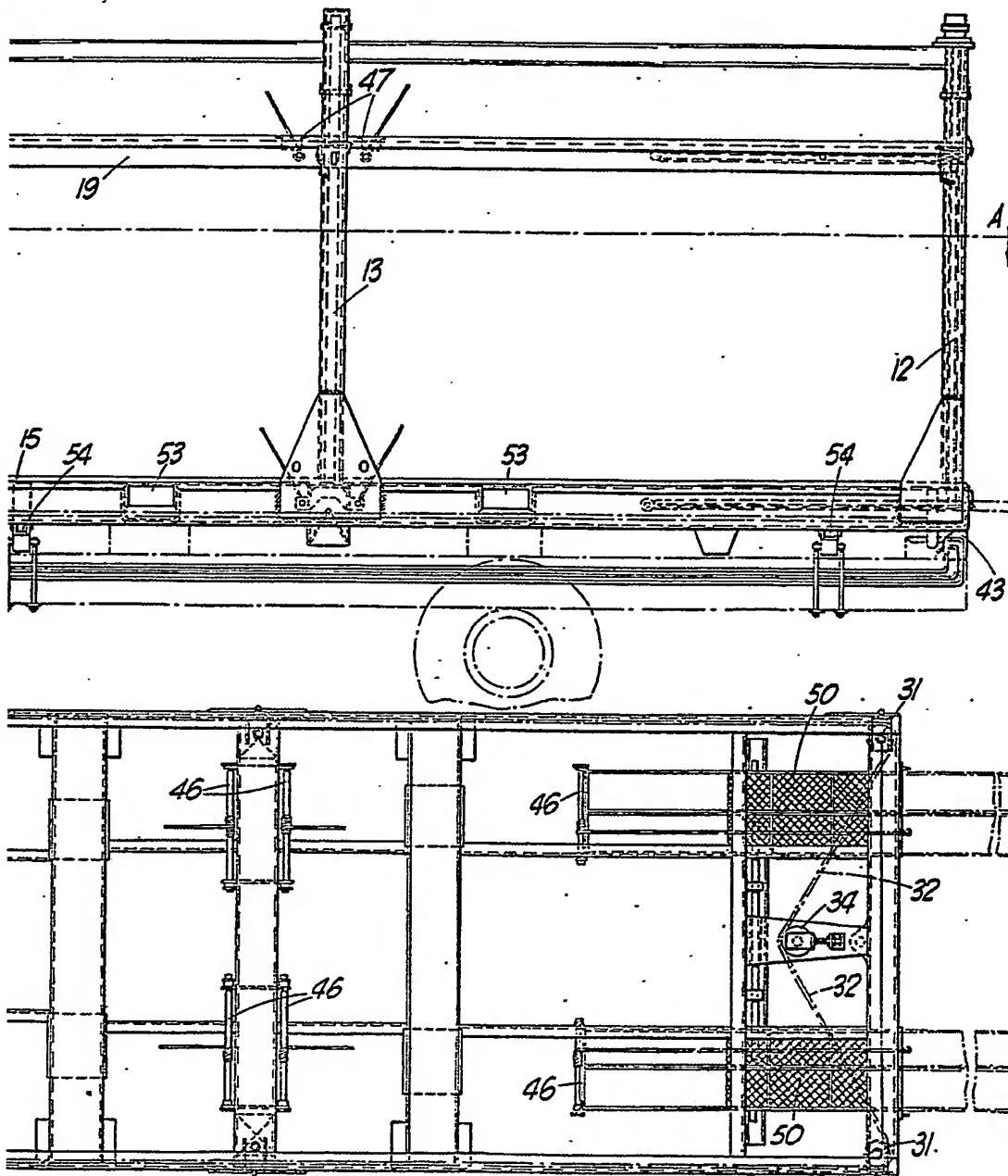
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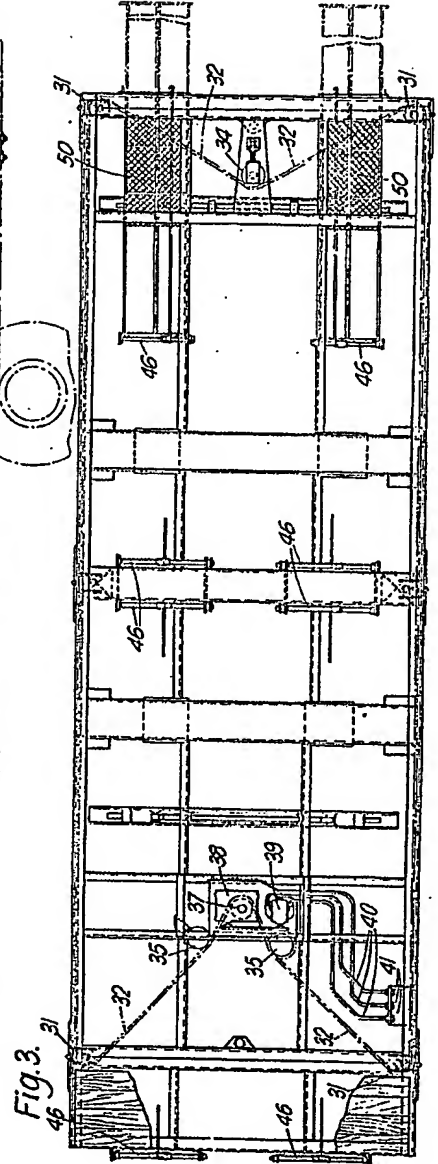
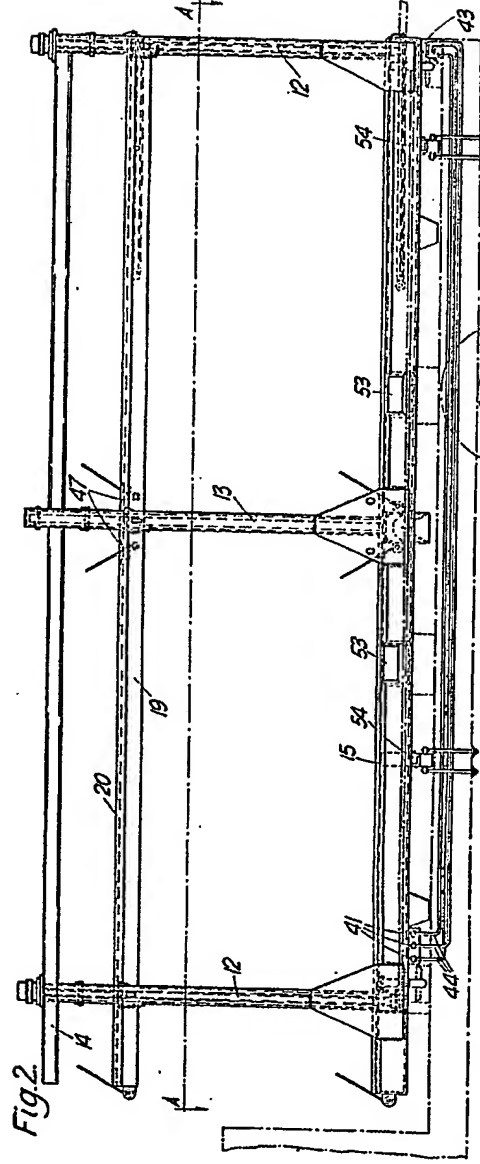
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Sheet 2



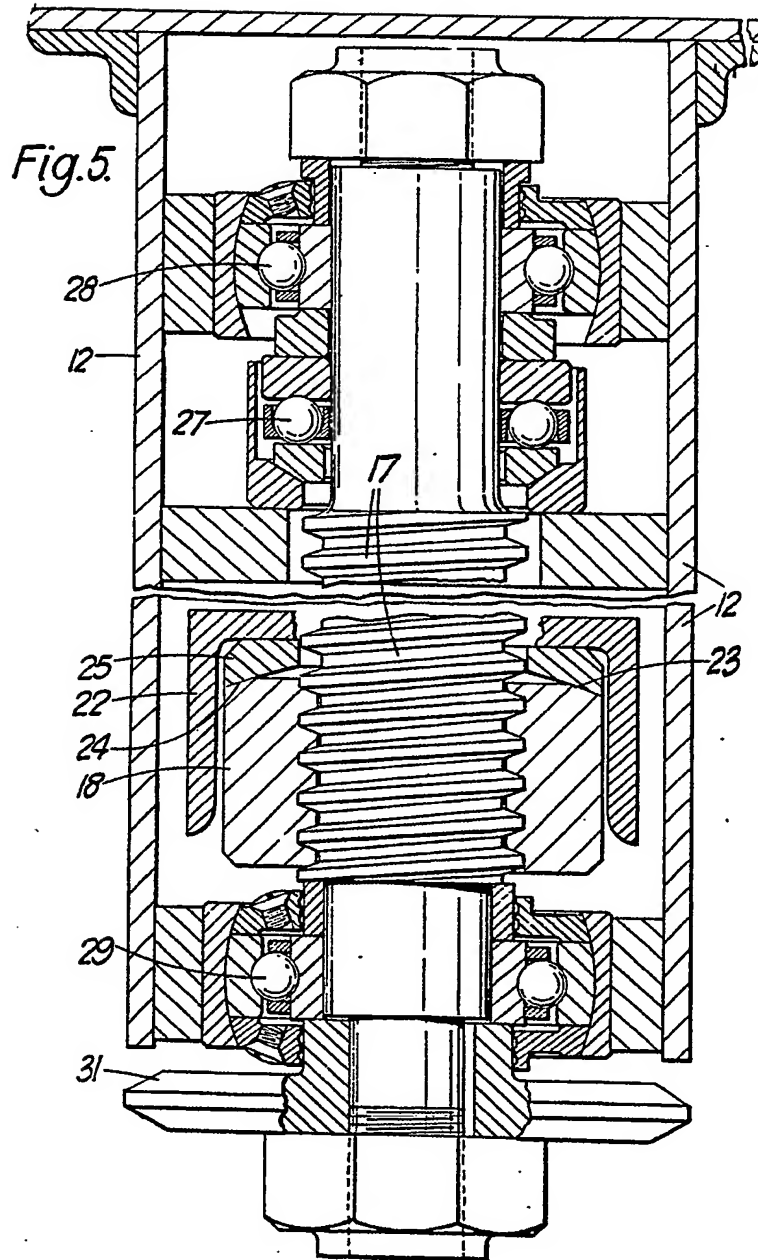




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